

REMARKS

Claims 1-2, 7 and 9 are pending in this application. Claim 1 is written in independent form. By this Amendment, claim 1 is amended. As the Examiner has searched the art for references having coarse particles in excess of the range of amended claim 1, no new matter is added that would necessitate further consideration and/or search. Further support for the amendments may be found at least at page 10, line 2 and page 22, line 10 of the specification.

Rejections Under 35 U.S.C. §112

Claims 1, 2, 7 and 9 are rejected under 35 U.S.C. §112, first paragraph, for allegedly failing to comply with the written description requirement. The rejection is respectfully traversed.

Specifically, it is alleged that there is no “literal or clear support for less than 140,000/0.5 ml” in the specification.” It is further alleged that “140,000 is not literally defined nor is there any and all values less than 140,000, as the claim requires, supported.”

35 U.S.C. §112, first paragraph, recites

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The test for determining whether the requirements of 35 U.S.C. §112, first paragraph, are met has been established by the U.S. Supreme Court in *Mineral Separation v. Hyde*, 242 U.S. 261, 270 (1916) and is referred to as the “undue experimentation” test. The “undue experimentation” test has been interpreted to require that the claimed invention be enabled so that any person skilled

in the art can make and use the invention without undue experimentation. Thus, there is no requirement for literal support for a claim term.

Further regarding the allegation that there is no “literal or clear support for less than 140,000/ 0.5 ml, Applicants again respectfully refer the Examiner to Table 1 of the specification which discloses semiconductor polishing compounds having a number of coarse particles from 66,595 to 141,933 per 0.5 ml. In reply to Applicants previous response to this same rejection, the Examiner asks “where is the value of 140,000 particles/0.5 ml. disclosed and where is it stated that the number of particles can be present in any and all amounts less than 140,000 particles/0.5 ml.?” The Examiner also states that “the interpretation of ‘no more than’ implies that the number of particles/0.5 ml. can be any and all values less than 140,00 particles/0.5 ml., such as for example, 1 particle/0.5 ml....”.

Applicants submit that the claim 1 recites “coarse particles of 0.5 μm in diameter, the number of coarse particles being no more than 140,000/0.5 ml” which means that there are no more than 140,000/0.5 ml of coarse particles. Table I shows several examples where the number of coarse particles is no more than 140,000. Moreover, although the Examiner may interpret the claim as reciting as including “any and all values less than 140,00 particles/0.5 ml.” claim 1 does not recite a range of 0-140,000 particles/0.5 ml. Rather, claim 1 recites that there are no more than 140,000/0.5 ml of coarse particles. As Table I shows several examples where the number of coarse particles is no more than 140,000, Table I demonstrates a semiconductor polishing compound described in the specification wherein the number of coarse particles is no more than 140,000/0.5 ml.

Contrary to the Examiner’s allegation, there is no requirement that the claimed range correspond exactly to the ranges disclosed in the specification (see *Ralston Purina Co. v. Far-*

Mar Co., Inc., 772 F.2d 1570, 227 USPQ 177 (Fed. Cir. 1985)). Rather, the issue is whether one of skill in the art could derive the claimed range from the disclosure (see *Union Oil v. Atlantic Richfield, Co.*, 208 F.3d 989, 997, 54 USPQ2d 1227, 1233 (Fed. Cir. 2000)). In the instant case, the specification discloses a range that corresponds to the upper limit recited in the claim and one of skill in the art could derive the claimed upper limit from the disclosure.

Applicants also point out that although the Examiner rejects the claims under 35 USC §112, first paragraph, for an alleged lack of support in the specification of 0-140,000/0.5 ml particles, the Examiner rejects the claims in light of Tamai by imputing a disclosure in Tamai of 0-2,500,000 coarse particles when Tamai in fact discloses no coarse particles less than 1,429,000/0.5 ml.

However, in an effort to expedite prosecution of the application, claim 1 is amended to recite a range set forth in Table I of the specification. Therefore, withdrawal of the rejection is respectfully requested.

Rejections Under 35 U.S.C. §103

Claims 1, 2, 7 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,248,144 to Tamai in view of U.S. Patent Publication No. 2002-0033382 to Kaufman. The rejection is respectfully traversed.

Tamai relates to a process for producing a polishing composition suitable for planarization in the production of semiconductor devices (column 1, lines 4-8). The process in Tamai includes using fumed silica having a bulk density of at least 70 grams per liter that is easily dispersed in water. The fumed silica in the polishing composition is disclosed as containing not more than 500,000 per 0.1 ml of agglomerates not smaller than 0.5 μm , when it is

newly produced” (i.e., polishing composition containing not more than 2,500,000 per 0.5 ml of agglomerates having a diameter of $<0.5\ \mu\text{m}$) (col. 3, lines 28-32).

It is alleged in the Office Action that the polishing composition of Tami corresponds to the claimed polishing composition having coarse particles of $0.5\ \mu\text{m}$ in diameter and the number of coarse particles being no more than 140,000 particles per 0.5 ml.

Claim 1 is amended to recite coarse particles of $0.5\ \mu\text{m}$ in diameter, the number of coarse particles being in a range of 66,595/0.5 ml to 112,453/0.5 ml, wherein the alkali aqueous solution contains at least one additive selected from a polishing accelerator, an oxidant, an organic acid, a complexing agent, a corrosion inhibitor and a surfactant.

Applicants first point out that the number of agglomerates not smaller than $0.5\ \mu\text{m}$ in Tamai is 2,500,000/0.5 ml. which clearly contemplates a polishing composition having coarse particles in excess of 140,000 particles/0.5 ml. This disclosure is further supported in Table 1 of Tamai which shows the number of “macroaggregates” (particles not smaller than $0.5\ \mu\text{m}$, see col. 7, lines 4-10) being in a range of 1,429,500/0.5 ml. to 2,006,000/0.5 ml. Thus, Tamai clearly discloses that the polishing composition includes coarse particles far in excess of 140,000/0.5 ml. A prior art reference that does not disclose a specific embodiment in the claimed range does not correspond to the claimed range (see *Atofina v. Great Lakes Chemical Corp.*, 441 F.3d 991 (Fed. Cir. 2006)). Moreover, “the disclosure of a genus in the prior art is not necessarily a disclosure of every species that is a member of that genus” (Id 441 F.3d at 999).

As discussed throughout the specification of the present application, due to the elements of the claimed semiconductor polishing compound, the fumed silica is prevented from being agglomerated and reduce and/or prevent polishing flaws in a semiconductor device due to the

criticality of the maximum amount of coarse particles (see for example paragraphs [0017], [0025], [0083] demonstrating the criticality of the claimed range).

In the Examiner's remarks, it is alleged that the disclosure in Tamai of a polishing composition that contains "not more than 500,000 per 0.1 ml of agglomerates not smaller than 0.5 μ m" includes the claimed value of 140,000/0.5 ml. However, there is nothing in Tamai which supports such an allegation. Rather, Tamai only discloses that there are no more than 500,000/0.1 ml of agglomerates not smaller than 0.5 μ m, when it is newly produced" (i.e., polishing composition containing not more than 2,500,000 per 0.5 ml of agglomerates having a diameter of <0.5 μ m). Further, as discussed above, the specification of Tamai only discloses that there are such agglomerates far in excess of a range of 66,595/0.5 ml to 112,453/0.5 ml. As discussed above, the least amount of such agglomerates disclosed in a polishing compound in Tamai is more than ten times greater than the upper limit of 112,453/0.5 ml., as claimed.

Therefore, Tamai fails to disclose the result effective variable as previously claimed. Accordingly, the disclosure of Tamai fails to render the rejected claims obvious.

Additionally, it is admitted in the Office Action that Tamai fails to disclose or suggest at least one additive selected from a polishing accelerator, an oxidant, an organic acid, a complexing agent, a corrosion inhibitor and a surfactant. It is alleged that "the skilled artisan would have appreciated and thus found it obvious to add any one of the claimed additives." Although no mention is made in the rejection of reliance on Kaufman as providing evidentiary support for the allegation that "the skilled artisan would have appreciated and thus found it obvious to add any one of the claimed additives," the Examiner explains in his response to Applicants' previous arguments that the Kaufman reference is so applied. However, Kaufman fails to overcome the deficiencies of Tamai discussed above.

Claim 1 is also amended to recite an average particle diameter of the particles of the fumed silica is in a range of 5 nm to 20 nm. In contrast, Tamai discloses a particle size of fumed silica being in a range of 24-39 nm. Kaufman discloses a particle size of 400 nm. Thus, the combination of references fails to disclose the additional claim feature.

Claim 1 is further amended to recite the alkali aqueous solution contains at least one additive selected from a group consisting of a polishing accelerator, an organic acid, a complexing agent, a corrosion inhibitor and a surfactant.

Kaufman discloses an alkali aqueous solution including an oxidant and therefore fails to disclose or suggest the features of the amended claims. As the combination of references fail to render the rejected claims obvious. Therefore, withdrawal of the rejection is respectfully requested.

Claims 1, 2, 7 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of U.S. Patent Publication No. 2003/0104770 to Pasqualoni, et al. (Pasqualoni) and Tamai. The rejection is respectfully traversed.

As discussed above, the claims are amended to recite coarse particles of 0.5 μm in diameter, the number of coarse particles being in a range of 66,595/0.5 ml to 112,453/0.5 ml, wherein the alkali aqueous solution contains at least one additive selected from a polishing accelerator, an oxidant, an organic acid, a complexing agent, a corrosion inhibitor and a surfactant.

It is alleged in the Office Action that Pasqualoni discloses coarse particles of 0.5 μm in diameter, the number of coarse particles being no more than 140,000/0.5 ml at paragraph [0013].

Paragraph [0013] recites that the “slurry composition has a large particle count of less than about 150,000 particles having a particles size greater than 0.5 μm in 30 μl of slurry.”

150,000 particles/30 μl equates to 2,500,000 particles/0.5 ml. which clearly contemplates a polishing composition having course particles in excess of 140,000 particles/0.5 ml. This disclosure is further supported in Tables 2 and 3 of Pasqualoni. For example, Table 2 shows the number of particles greater than 0.5 μm as being 2,500,000 particles/0.5 ml. Table 3 shows test polishes with fumed silica having particles greater than 0.5 μm in a range of 5,933,333-11,166,666/0.5 ml. Thus, Pasqualoni clearly discloses that the polishing composition includes course particles far in excess of a range of 66,595/0.5 ml to 112,453/0.5 ml.

In the Examiner’s remarks, it is alleged that the disclosure in Pasqualoni of a polishing composition that contains “less than about 150,000 particles having a particle size greater than about 0.50 μm , in a 30 μl sample” includes the value of 140,000/0.5 ml. However, there is nothing in Pasqualoni which supports such an allegation. Rather, Pasqualoni only discloses that there are less than about 150,000 particles having a particle size greater than about 0.50 μm , in a 30 μl sample (i.e., a polishing composition containing less than 2,500,000 partices/0.5 ml of agglomerates having a diameter of <0.5 μm). Further, the specification of Pasqualoni only discloses that there are such agglomerates far in excess of 140,000/0.5 ml. As discussed above, the least amount of such agglomerates disclosed in a polishing compound in Tamai is more than five times greater than the upper limit of 112,453/0.5 ml., as claimed.

As discussed above, a prior art reference that does not disclose a specific embodiment in the claimed range does not correspond to the claimed range (see *Atofina v. Great Lakes Chemical Corp.*, 441 F.3d 991 (Fed. Cir. 2006)). Moreover, “the disclosure of a genus in the prior art is not necessarily a disclosure of every species that is a member of that genus” (Id 441

F.3d at 999). As discussed throughout the specification of the present application, due to the elements of the claimed semiconductor polishing compound, the fumed silica is prevented from being agglomerated and reduce and/or prevent polishing flaws in a semiconductor device due to the criticality of the maximum amount of coarse particles (see for example paragraphs [0017], [0025], [0083] demonstrating the criticality of the claimed range).

Thus, Pasqualoni fails to disclose or suggest the number of particles having a diameter of 0.5 μm being in a range of 66,595/0.5 ml to 112,453/0.5 ml. As Tamai fails to overcome the deficiencies of Pasqualoni, the combination of references, whether considered alone or in combination, do not render the claims obvious.

Further, as discussed above, claim 1 is amended to recite an alkali aqueous solution contains at least one additive selected from a group consisting of a polishing accelerator, an organic acid, a complexing agent, a corrosion inhibitor and a surfactant. As Pasqualoni discloses an alkali aqueous solution including an oxidant and therefore fails to disclose or suggest the features of the amended claims.

Accordingly, withdrawal of the rejection is respectfully requested.

Claims 1, 2, 7 and 9 stand rejected under 35 U.S.C. §103(a) as being obvious over either the combination of Tamai and Kaufman or the combination of Kaufman, Tamai and Pasqualoni. The rejection is respectfully traversed.

As discussed above, none of Tamai, Kaufman or Pasqualoni, whether considered alone or in combination, discloses or suggests all of the features recited in the amended claim. Accordingly, withdrawal of the rejection is respectfully requested.

CONCLUSION

In view of the above remarks and amendments, Applicants respectfully submit that each of the rejections has been addressed and overcome, placing the present application in condition for allowance. A notice to that effect is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to contact the undersigned.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Fitzpatrick at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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By



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